



Naval Surface Warfare Center, Dahlgren Division

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Surface Warfare Evolution



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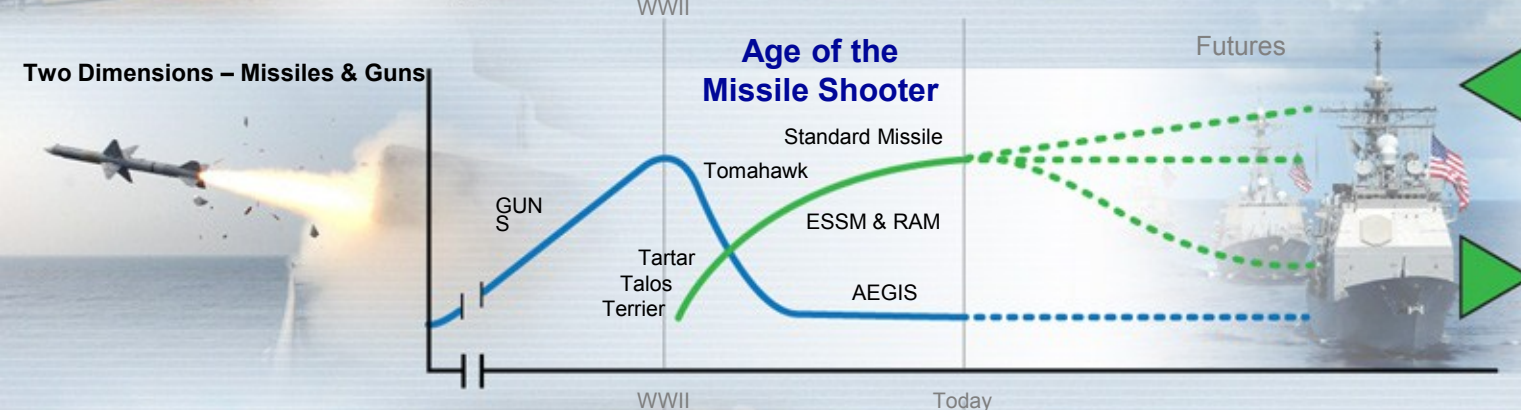


Needs

Counter Air
Weapon Range
Agile Targets

Technologies

Small Electronics
Precision Guidance
RADAR

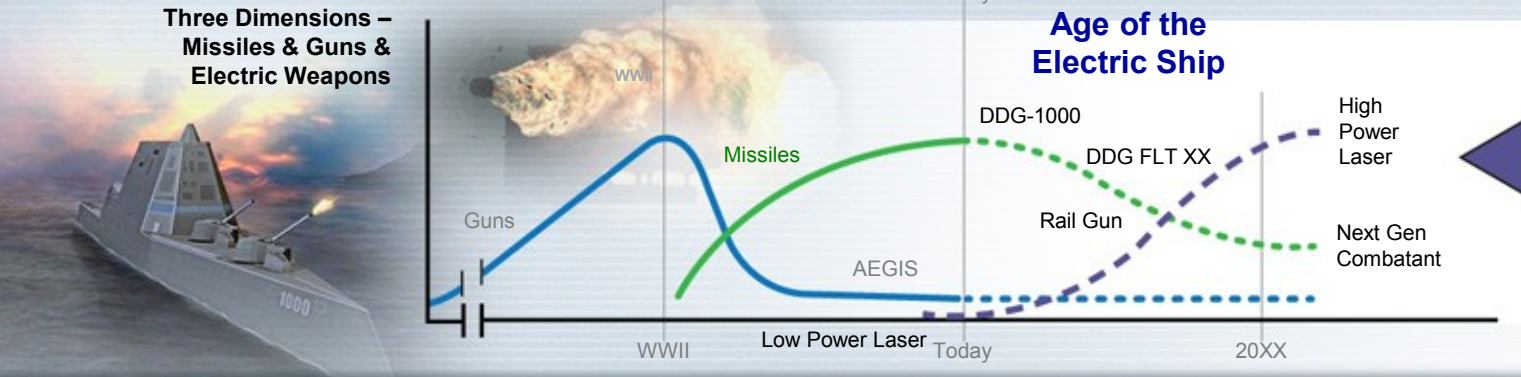


Needs

Agile Targets
Swarming Threats
Engagement Time
Cost-Per-Shot
Graduated Kill

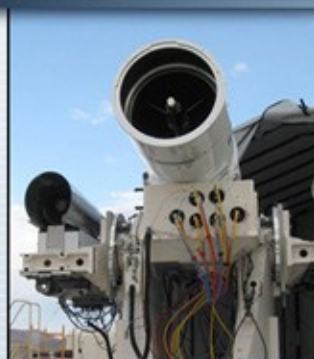
Technologies

Energy Storage
Energy Distribution
Cryogenics
Rail Gun
High Power Laser
Directed Energy

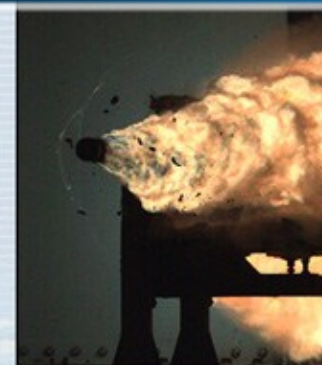


Capability Evolution

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Increasing capability, capacity, and integration complexity



Directed Energy Weapon (DEW) Tactical Situation



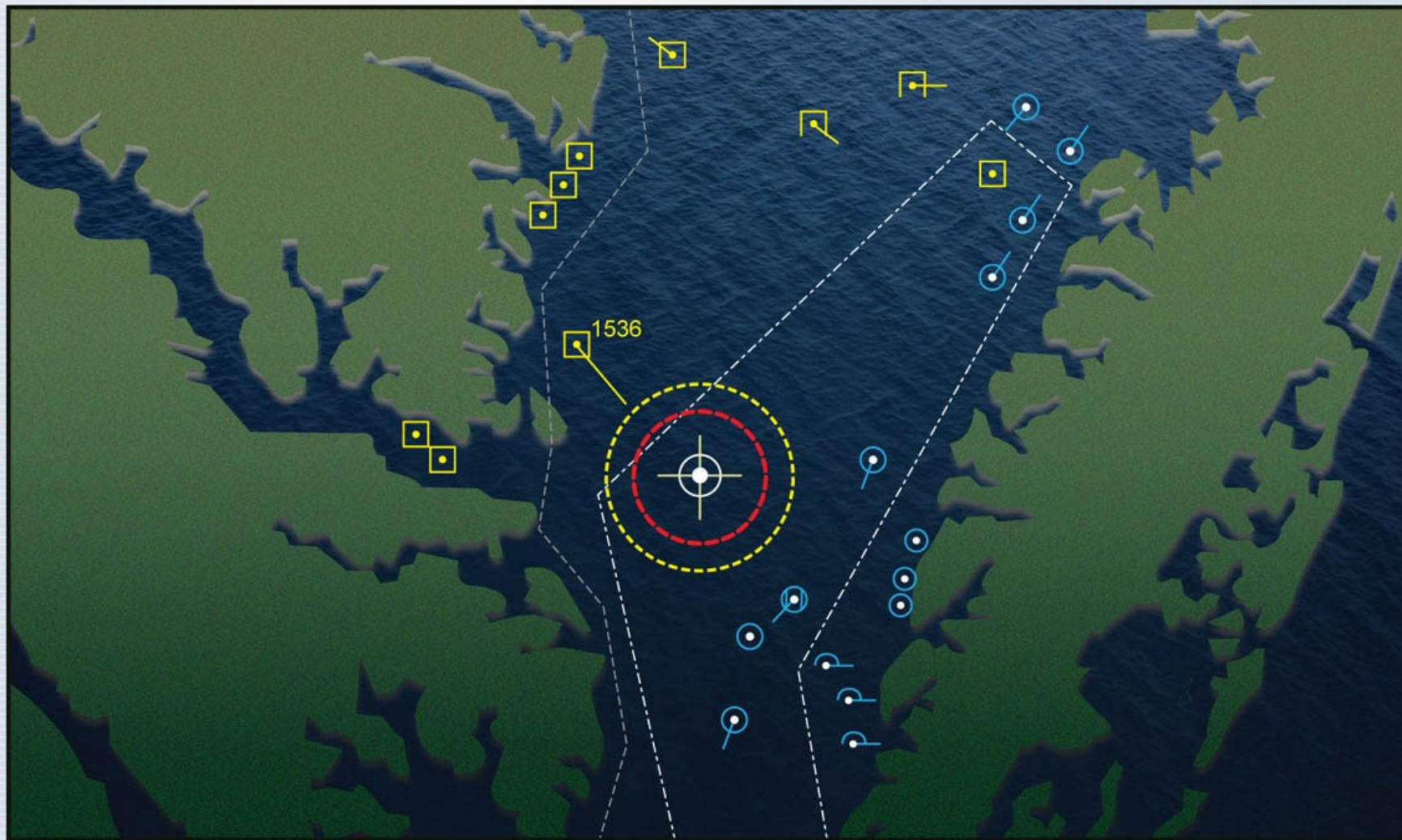
System State Transition from Sensor to Weapon to Sensor

- **Sensor**
 - High quality sensor utilizing beam director optics
- **Identification ID/Assess**
 - Active interrogation utilizing non lethal mode to determine intent
- **Weapon**
 - Lethal engagement
- **Sensor**
 - Battle damage assessment

TACSIT Actors

- Track Supervisor (Track Sup)
- Tactical Action Officer (TAO)
- Weapons Control Officer (Weps)
- Commanding Officer (Captain)

DEW TACSIT / $t = 0$



Our Future



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- **Limited footprint aboard ship**
 - Requires efficient use of available space
 - Multi-function systems (Sense, ID, Scalable effects) help manage top side requirements
- **Next generation systems with high-resolution imagery will enable extremely precise track and ID, to include assessment of intent**
- **Electric weapons conserve kinetic assets**
- **Power generation, storage and conversion technologies will need to change to support next-generation weapon systems**
 - Need continued technology advancements in these areas
 - Requires power management and integration to be more closely linked in future ship/weapon designs

